

TED (21)1004
(Revision-2021)

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Reg.No.....
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**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, NOVEMBER - 2023**

APPLIED CHEMISTRY

[Maximum marks: 75]

[Time: 3 Hours]

PART A

**I. Answer all the following questions in one word or one sentence. Each question carries 1 mark
(9 x 1 = 9 Marks)**

		Module outcome	Cognitive level
1	Which quantum number defines the three-dimensional shape of an atomic orbital?	M1.02	U
2	The type of bond formed when the shared pair of electrons are contributed by only one of the combining atoms is called bond.	M1.03	U
3	Write the relationship between pH and pOH.	M2.02	U
4	What is the reason for hardness of water?	M2.03	U
5	In salt water NaCl would be considered as the.....	M2.01	U
6	A one atom thick layer of carbon atoms is called.....	M3.03	R
7	Name the monomer of natural rubber.	M3.02	R
8	According to electronic concept, removal of electrons is	M4.01	U
9	What is a non-electrolyte?	M4.03	R

PART B

II. Answer any eight questions from the following. Each question carries 3 marks.

(8 x 3 = 24 Marks)

		Module outcome	Cognitive level
1	State Heisenberg's uncertainty principle. Give its mathematical statement.	M1.02	U
2	Explain the formation of a covalent bond with an example.	M1.03	U
3	Calculate the molarity of the solution containing 10.6g Na ₂ CO ₃ in 500mL. (Atomic weight of Na-23, C-12, O-16)	M2.01	A
4	Hard water does not produce lather readily with soap. Give reason.	M2.03	U
5	Calculate the pH of 0.01M NaOH solution.	M2.02	A
6	Differentiate between homo polymers and copolymers. Give one example for each.	M3.02	U
7	Write a note on safety glass.	M3.01	R
8	What are carbon nanotubes? How are they classified?	M3.03	R
9	What is a fuel cell? Give one example.	M4.04	R
10	State Faraday's first law of electrolysis. Give its mathematical statement.	M4.02	R

PART C

Answer all questions. Each question carries seven marks

(6 x 7 = 42 Marks)

		Module outcome	Cognitive level
III	Write the postulates of Bohr's model of atom. Give any three demerits of Bohr's atom model. (7 marks) OR	M1.01	R
IV	(a) Write the de Broglie relation for a material particle and explain the terms. Calculate the de Broglie wavelength for an electron moving with a velocity of 10^4 ms^{-1} . ($h = 6.625 \times 10^{-34} \text{ kgm}^2\text{s}^{-1}$, $m = 9.1 \times 10^{-31} \text{ kg}$) (5 marks) (b) State Aufbau principle. (2 marks)	M1.02 M1.02	U R
V	(a) What are buffer solutions? How are they classified? Write one example for each type. (5 marks) (b) Suggest suitable indicators for the following titrations. (i) Na_2CO_3 x HCl (ii) NaOH x $\text{H}_2\text{C}_2\text{O}_4$ (2 marks) OR	M2.02 M2.01	R A
VI	(a) Explain ion-exchange method for the removal of permanent Hardness. (5 marks) (b) What is boiler scale? (2 marks)	M2.03 M2.03	U R
VII	(a) List any five applications of pH. (5 marks) (b) 20 ml of NaOH solution was neutralized by 25ml of HCl solution of normality 0.01. Find the normality of NaOH solution. (2 marks) OR	M2.02 M2.01	R A
VIII	(a) Draw a flow chart showing the production of potable water for municipal supply. (5 marks) (b) What is soda lime process? (2 marks)	M2.04 M2.03	U R
IX	(a) What is refractory material? List the characteristics of refractories? (5 marks) (b) List the merits of Vulcanisation. (2 marks) OR	M3.01 M3.02	R R
X	(a) Explain the classification of nanomaterials based on dimension with one example for each. (5 marks) (b) What are the components of brass and bronze? (2 marks)	M3.03 M3.01	U R
XI	(a) Write any four differences between electrolytic cell and electrochemical cell. Give one example for each. (5 marks) (b) Define electrochemical series. (2 marks)	M4.03 M4.04	U U

XII	OR		
	(a) Define corrosion. Explain the cathodic protection method for the prevention of corrosion. (5 marks)	M4.05	U
	(b) Define electrolysis. (2 marks)	M4.03	R
XIII	(a) Explain the electroplating of Nickel on mild steel object. (5 marks)	M4.03	U
	(b) Distinguish between electrolytes and non – electrolytes. (2 marks)	M4.03	U
XIV	OR		
	(a) Calculate the mass of silver deposited by the electrolysis of AgNO_3 solution by passing a current of 6A for 10 minutes. (Equivalent weight of Ag = 106g, IF = 96500C) (5 marks)	M4.02	A
	(b) What is secondary cell? Give one example. (2 marks)	M4.04	U
